

# C1 Exercise 2C (completing the square)

1 Complete the square for  $x^2 + 4x$

$$x^2 + 4x = (x+2)^2 - 4$$

have the coefficient of  $x$

$$\begin{aligned} (x+2)^2 - 4 \\ = x^2 + 4x + 4 - 4 \end{aligned}$$

... yeah. That works!

C1Ex2C

2 Complete the square for  $x^2 - 6x$

$$x^2 - 6x = (x - 3)^2 - 9$$

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3 Complete the square for  $x^2 - 16x$

$$x^2 - 16x = (x - 8)^2 - 64$$

4 Complete the square for  $x^2 + x$

$$x^2 + x = \left(x + \frac{1}{2}\right)^2 - \frac{1}{4}$$

5 Complete the square for  $x^2 - 14x$

$$x^2 - 14x = (x - 7)^2 - 49$$

6 Complete the square for  $2x^2 + 16x$

$$2x^2 + 16x = 2(x^2 + 8x)$$

$$= 2[(x+4)^2 - 16]$$

$$= 2(x+4)^2 - 32$$

7 Complete the square for  $3x^2 - 24x$

$$3x^2 - 24x = 3[x^2 - 8x]$$

$$= 3[(x-4)^2 - 16]$$

$$= 3(x-4)^2 - 48$$

8 Complete the square for  $2x^2 - 4x$

$$2x^2 - 4x = 2[x^2 - 2x]$$

$$= 2[(x-1)^2 - 1]$$

$$= 2(x-1)^2 - 2$$



9 Complete the square for  $5x^2 + 20x$

$$5x^2 + 20x = 5[x^2 + 4]$$

$$= 5[(x+2)^2 - 4]$$

$$= 5(x+2)^2 - 20$$

10 Complete the square for  $2x^2 - 5x$

$$2x^2 - 5x = 2 \left[ x^2 - \frac{5}{2}x \right]$$

$$= 2 \left[ \left( x - \frac{5}{4} \right)^2 - \frac{25}{16} \right]$$

$$= 2 \left( x - \frac{5}{4} \right)^2 - \frac{25}{8}$$

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$$3x^2 + 9x = 3 \left[ x^2 + 3x \right]$$

$$= 3 \left[ \left( x + \frac{3}{2} \right)^2 - \frac{9}{4} \right]$$

because

$$\begin{aligned} \left( x + \frac{3}{2} \right) \left( x + \frac{3}{2} \right) &= x^2 + \frac{3}{2}x + \frac{3}{2}x + \frac{9}{4} \\ &= x^2 + 3x + \frac{9}{4} \end{aligned}$$

$$= 3 \left( x + \frac{3}{2} \right)^2 - \frac{27}{4}$$

$$= 3 \left( x + \frac{3}{2} \right)^2 - 6\frac{3}{4}. \text{ if you prefer.}$$

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$$12 \quad 3x^2 - x$$

$$= 3\left(x^2 - \frac{1}{3}x\right)$$

$$= 3\left(x - \frac{1}{6}\right)^2 - \frac{1}{36}$$

$$= 3\left(x - \frac{1}{6}\right)^2 - \frac{1}{12}.$$